BeanAir
WIRELESS IIOT SENSORS

2.4 GHz

BeanDevice® 2.4GHz AX-3DS

Wireless IIOT accelerometer sensor| Shock and impact monitoring

PRODUCT VIDEO

FEATURED VIDEO

USER GUIDE

QUICK START

MECHANICAL DRAWING

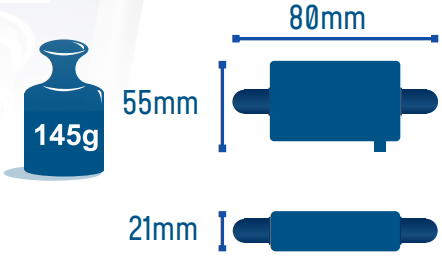
STEP FILE

SmartSensor

2year Warranty

MADE IN GERMANY

CE FC R 207-132085



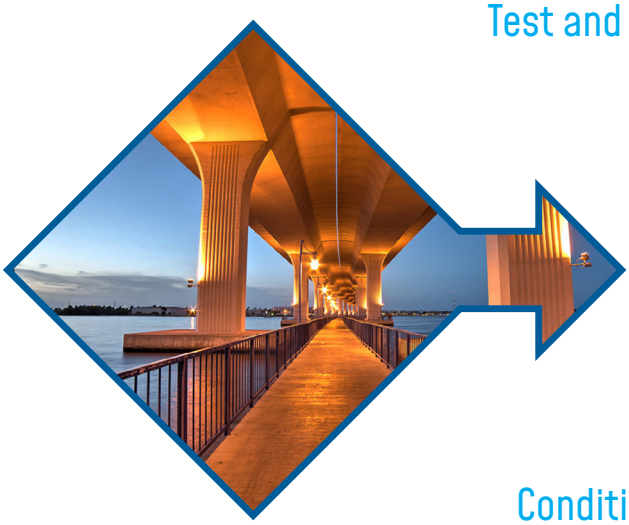
MAIN FEATURES

- Embedded data logger : up to 1 million data points (with events dating)
- Excellent radio link relying on the radio antenna diversity developed by Beanair®
- Wireless accelerometer dedicated to shock Scalable measurement range : ±6g/±12g/±24g or ±2g/±4g/±8g
- SSD (Smart Shock Detection), wireless sensor can wakeup on shock detection (software configurable)
- Waterproof IP67 casing (Nema 6)
- Integrated Lithium-Ion battery charger

BeanDevice® 2.4GHz AX-3DS

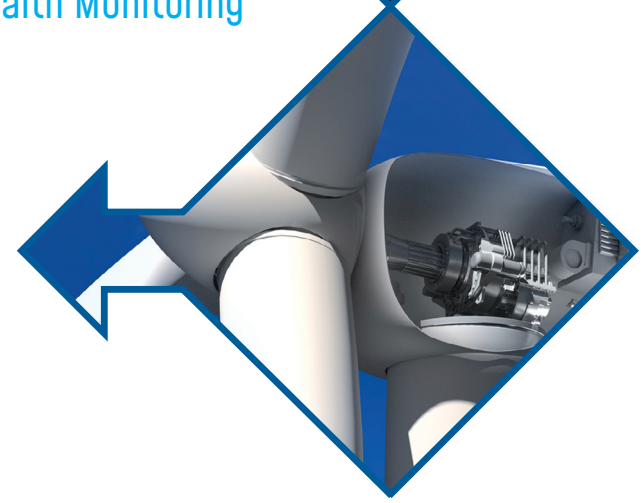
APPLICATIONS

Test and Measurement



Structural Health Monitoring

Condition Monitoring

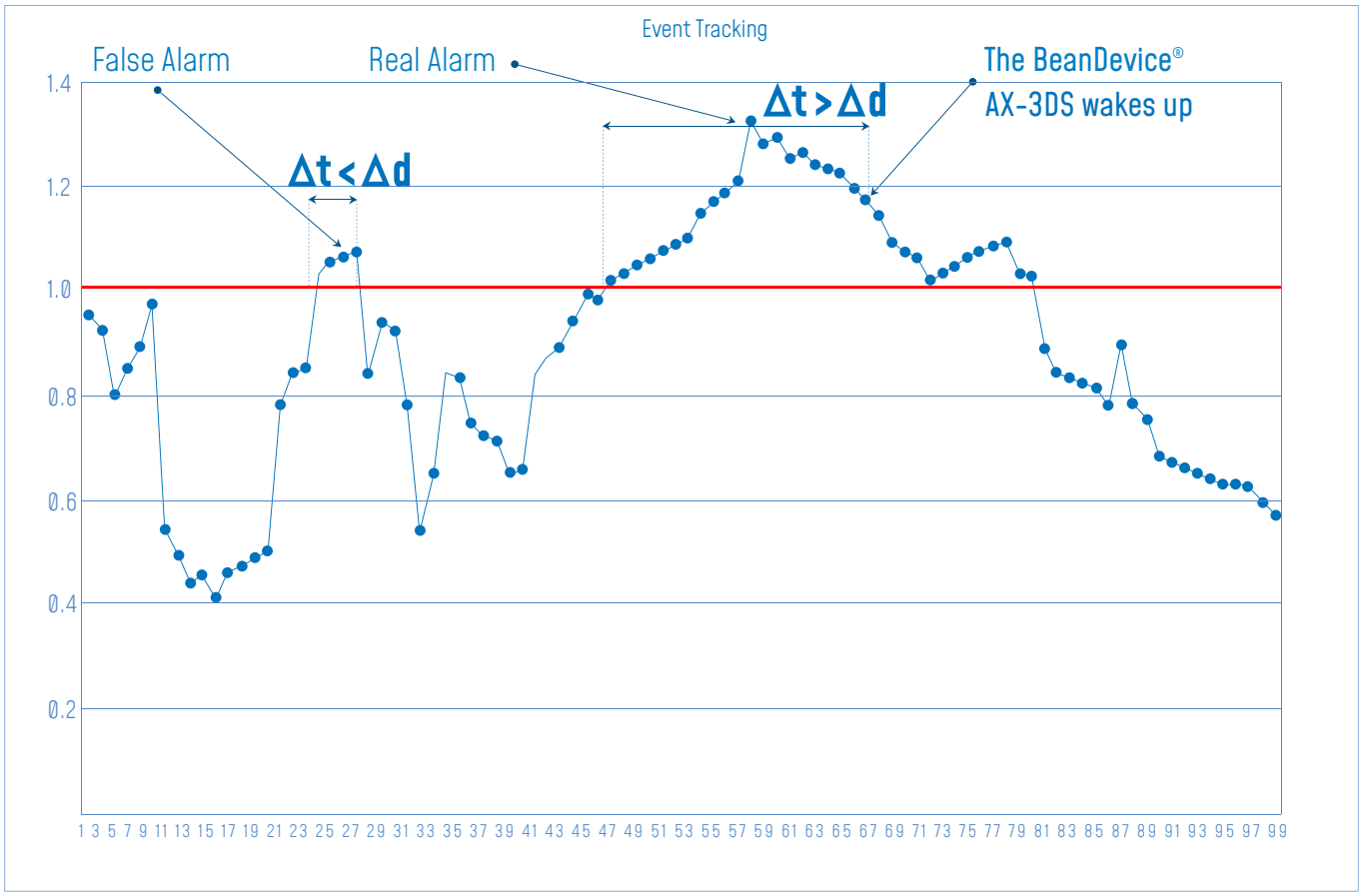


SMART SHOCK DETECTION TECHNOLOGY

The BeanDevice® 2.4GHz AX-3DS integrates a smart shock detection technology which permits to detect & recognize a shock event during the sleeping or deep sleeping mode of the BeanDevice® 2.4GHz AX-3DS. When the BeanDevice® 2.4GHz AX-3DS is in sleeping mode, the accelerometer continues to track a shock event with a power consumption of 68 uA in sleeping mode and 28uA in deep sleeping mode. A hystereris on the shock event, fully configurable through the BeanScape® 2.4GHz, allows to avoid false alarm.

EXAMPLE : THIS CURVE SHOWS TWO SHOCK EVENTS, ONE CONSIDERED AS SIGNIFICANT (REAL ALARM) AND ANOTHER CONSIDERED AS NOT SIGNIFICANT (FALSE ALARM).

BeanDevice® 2.4GHz AX-3DS



Δd : shock detection hysteresis.
Δt : Observed duration
If **Δt = Δd**, the shock event is detected and recognized, the BeanDevice® wakes up and start data sampling in “streaming mode”.

The following tables show the accelerometer sampling rate and the hysteresis time value in deep sleeping mode and sleeping mode of the BeanDevice® 2.4GHz AX-3DS.

Accelerometer sampling rate during deep sleeping mode (in HZ)	Δd max value(s)	Resolution
0.5	128 s	2 s
1	64 s	1 s
2	32 s	500 ms
5	12.8 s	200 ms
10	6.4 s	100 ms

Accelerometer sampling rate during deep sleeping mode (in HZ)	Δd max value(s)	Resolution
50	1.28 s	20 ms
100	640 ms	10 ms
400	160 ms	2.5 ms
1000	64 ms	1 ms

BeanDevice® 2.4GHz AX-3DS

SHOCK MEASUREMENT ON PANTOGRAPH

REMOTE CONFIGURATION & MONITORING

BeanScape® 2.4GHz Basic

The BeanScape® 2.4GHz application allows the user to view all the data transmitted by the BeanDevice®2.4 GHz AX-3DS
With the OTAC (Over-the-Air configuration) feature, the user can remotely configure the V

SEVERAL DATA ACQUISITION MODES ARE AVAILABLE ON THE BEANDEVICE® 2.4 GHz AX-3DS :

- Low Duty Cycle Data Acquisition mode (LDCDA) : the data acquisition is immediately transmitted by radio. The transmission frequency can be configured from 1s to 24h.
- Survey Mode: the measured value is transmitted by radio whenever an alarm threshold (fixed by the user) is detected (4 alarms threshold levels High/Low). Meanwhile, the device sends frequently a beacon frame informing its current status.
- Streaming Packet Mode : all measured values are transmitted by packet within a continuous flow at 3 ksps/s maximum

BeanDevice® 2.4GHz AX-3DS

REMOTE CONFIGURATION & MONITORING

BeanScape® 2.4 GHz Premium+

The BeanScape® 2.4GHz Premium+ integrates an OPC DA server (Data Access). OPC DA is particularly well suited for real time measurement and data sharing.

Each data/measurement can be associated to a tag or its attributes and shared with one or many OPC clients.

For further information about the different data acquisition modes:
TN-RF-008 – "Data acquisition modes available on the BeanDevice®"

ANTENNA DIVERSITY

While the vast majority of wireless IIOT sensors show their limits in harsh industrial environment, the BeanDevice® 2.4GHz AX-3DS integrates an innovative antenna diversity design, boosting the radio link quality in environments subject to random and diverse disturbances. Antenna Diversity improves both the quality and reliability of a wireless link by 30%.

EMBEDDED DATA LOGGER UP TO 1 MILLION DATA POINTS

The BeanDevice® 2.4GHz AX-3DS integrates an embedded data logger, which can be used to log data when a wireless IIOT sensors can not be easily deployed on your site. All the data acquisition are stored on the embedded flash and then transmitted to the BeanGateway® 2.4 GHz when a wireless IIOT sensors is established.

The data logger function is compatible with all the data acquisition mode available on your BeanDevice® 2.4 GHz AX-3DS :

- LowDutyCycle Data Acquisition
- Survey
- Shock detection
- Streaming packet

BeanDevice® 2.4GHz AX-3DS

EXAMPLE : SHOCK DETECTION ON A TRAIN

- In standalone operation, the BeanDevice® 2.4GHz AX-3DS stores all the measurements on its embedded datalogger. Thus, a direct connection with the BeanGateway® 2.4GHz is not needed.
- When the train is moving, all the acquired measurements are stored on datalogger.
- Data logs can be transmitted to the BeanGateway® 2.4GHz on request. Once a successful transmission is done, the user can choose to erase automatically the logs from the datalogger memory, so new ones can be stored.

For further information about the Datalogger, please read the following technical note :
TN-RF-007 – "BeanDevice® DataLogger User Guide "

TECHNICAL SPECIFICATIONS

PRODUCT REFERENCE

BND-2.4GHZ-AX3DS -MR-RB-MO

MR – Measurement Range (1g = 9806.65 mm/s^2)	PS - Power Supply	MO - Mounting Option
24G : ±6/12/24g measurement range	RB : Rechargeable battery	SCM - Screw Mounting Lid
8G : ±2/4/8g measurement range		MM - Magnetic Mounting Lid
		Leave it empty if there is no mounting option

Example 1: BND-2.4GHZ-AX3DS-24G-RB, Wireless Accelerometer with ±6/12/24g measurement range, rechargeable battery
Example 2: BND-2.4GHZ-AX3DS-8G-RB-SCM, Wireless Accelerometer with ±2/4/8g measurement range, rechargeable battery, screw mounting option

BeanDevice® 2.4GHz AX-3DS

TECHNICAL SPECIFICATIONS

SENSOR SPECIFICATIONS	
Accelerometer Technology	Low power MEMS technology
Scalable measurement range	24G Version : ±6g / ±12g / ±24g 8G Version : ±2g / ±4g / ±8g
Measurement resolution	24G Version : 3 mg/digit @±6g , 6 mg/digit @±12g , 12 mg/digit @±24g 8G Version : 1mg/digit @±2g , 2 mg/digit @±4g , 3.9 mg/digit @±8g
Typical non-linearity (Full scale, @ 25°C)	±0,15% for the version BND-2.4GHZ-AX3DS-8G-RB ±0,19% for the version BND-2.4GHZ-AX3DS-24G-RB
Sensitivity change Vs temperature	±0,01% /°C
Zero-g level change vs temperature (max delta from 25°C)	24G Version : ±0,4 mg/°C 8G Version : ±0,1 mg/°C
Typical zero-g level offset accuracy	24G Version : ±70 mg 8G Version : ±20 mg
Analog to Digital converter	12-bit with temperature compensation
Noise spectral density @ BW 10Hz	24G Version : 650 µg/√Hz 8G Version : 218 µg/ √Hz
Anti-aliasing filter	Butterworth 2th order filter

CONFIGURABLE SETTINGS FROM THE BEANSCAPE® 2.4GHZ SOFTWARE	
Data Acquisition mode (SPS = sample per second)	Dynamic data acquisition: Streaming and SSD (Smart Shock Detection)
Shock detection function	• Shock threshold in mg • Data acquisition sample rate in sleeping mode • Data acquisition sample rate after the shock detection • Shock detection hysteresis
Sampling Rate (in streaming mode)	Minimum: 1 SPS Maximum: 3 kSPS per axis (one axis enabled) 1.5 kSPS per axis (2-axis enabled) 1 kSPS per axis (3-axis enabled)
Power Mode	Battery saver mode & Active power mode

EMBEDDED DATA LOGGER	
Storage capacity	up to 1 millions data points
Wireless data downloading	3 minutes to download the full memory (average time)

TIMESYNC FUNCTION : CLOCK SYNCHRONIZATION OVER THE WIRELESS IOT SENSOR	
Clock synchronization accuracy	±2.5 ms (at 25°C)
Crystal specifications	Tolerance ±10ppm, stability ±10ppm

BeanDevice® 2.4GHz AX-3DS

TECHNICAL SPECIFICATIONS

RF SPECIFICATIONS	
Wireless Technology	Ultra-Power and license-free 2.4Ghz radio technology (IEEE 802.15.4E)
WSN Topology	Point-to-Point / Star
Data rate	250 Kbits/s
RF Characteristics	ISM 2.4GHz – 16 Channels. Antenna diversity designed by Beanair®
TX Power	+18 dBm
Receiver Sensitivity	-104dBm
Maximum Radio Range	500 m in Line-Of-Sight 30-100 m in Non-Line-of-Sight
Antenna	Omnidirectional radome antenna with antenna diversity Gain : 3 dBi Waterproof IP67

ENVIRONMENTAL AND MECHANICAL	
Casing	Aluminum AL6061 & Waterpoof casing Dimensions in mm (LxWxH): 100x55x21 mm Weight (battery included) : 155g
IP | NEMA Rating	IP67 | Nema 6
Shock resistance	100g during 50 ms
Operating Temperature	-40 °C to +60 °C
Norms	· CE Labelling Directive R&TTE (Radio) ETSI EN 300 328 · FCC (North America) · ARIB STD-T66 Ver 3.6 ROHS - Directive 2002/95/EC

POWER SUPPLY	
Integrated battery charger	Integrated Lithium-ion battery charger with high precision battery monitoring : • Overvoltage/Overcurrent/Short-Circuit/ Undervoltage protection • Battery Temperature monitoring
Current consumption @3,3V	• During data acquisition : 20 to 30 mA • During Radio transmission : 60 mA @ 18 dBm • During sleeping mode: 68uA • During Battery Saver Mode : < 28 µA
External power supply	8-28VDC with reverse polarity protection
Rechargeable Lithium-Polymer battery	Capacity 1.25 Ah

INCLUDED ACCESSORIES	
	1x Magnet to Power ON/Power OFF the device
	1x M8 Cap for Power Supply

BeanDevice® 2.4GHz AX-3DS

TECHNICAL SPECIFICATIONS

OPTIONAL ACCESSORIES AND SERVICES	
External Power Supply	Wall plug-in, Switchmode power Supply 12V @ 1.25A with sealed M8 Plug (IP67/Nema 6) Ref: M8-PWR-12V
M8 extension cable for external power supply	Molded cable with M8-3pins male plug Material: PVC with shield protection IP Rating : IP67 | Nema 6 Cable length: 2 meters , Ref : CBL-M8-2M Cable length : 5 meters, Ref : CBL-M8-5M Cable length: 10 meters, Ref : CBL-M8-10M
Calibration certificate	Calibration certificate provided by Beanair GmbH A static calibration method is used on a granite surface plate DIN876 Ref: CERT-CAL-SMART

GETTING STARTED WITH A WIRELESS IIOT SENSORS

BeanAir
Rethinking Sensing Technology

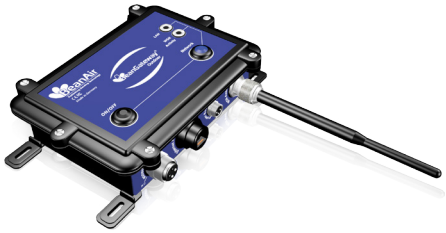
BeanGateway
Indoor Version

OPC FOUNDATION
OPC SERVER

BeanDevice
2.4GHz AX3DS

OR

BeanScape
Wireless IIOT Sensors Supervision Software



BeanGateway
Outdoor Version

2year
Warranty

The BeanDevice® 2.4 GHz AX-3DS operates only on our wireless IIOT sensors, you will need the BeanGateway® 2.4GHz and the BeanScape® 2.4GHz for starting a wireless IIOT sensors

For further information about BeanDevice® battery life :
TN-RF-002 Current consumption in active & sleeping mode
TN-RF-012 Beandevice autonomy in Streaming and Streaming Packet Mode

BeanDevice® 2.4GHz AX-3DS

BEANDEVICE® 2.4GHZ AX-3DS FRONT VIEW

Product specifications are subject to change without notice.
Contact Beanair for latest specifications.

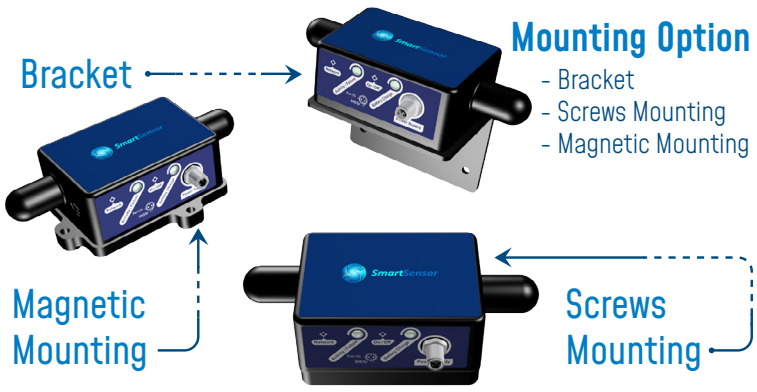
OPTIONS AND ACCESSORIES

AC/DC Power supply with M8 Plug

Ref:M8-PWR-12V
- Wall plug-in power supply,
  Output: 12VDC, M8-3Pins plug
- AC Power plug: Europe/UK
  Northamerica /China/Australia
- Waterproof - IP67

Mounting Option

- Bracket
- Screws Mounting
- Magnetic Mounting



Molded Cable with M8 plug

Ref:CBL-M8-2M
(cable length : 2 meters)
- CBL-M8-5M
(cable length : 5 meters)
- CBL-M8-10M
(cable length : 10 meters)

X-SOLAR

(SOLAR Charging Controller)

High efficiency Solar Panel
with Solar Charging Controller
and Lead-acid battery

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